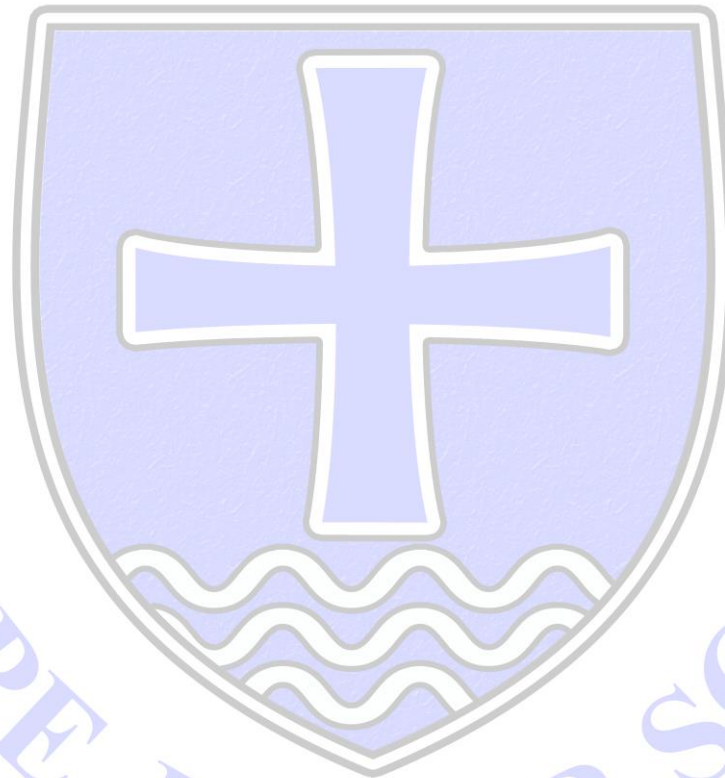


# Ryhope Junior School



**Progression in Design & Technology**

### **Purpose of Study:**

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth, and well-being of the nation.

### **Aims:**

The national curriculum for design and technology aims to ensure that all pupils:

- Develop the creative, technical, and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users.
- Critique, evaluate and test their ideas and products and the work of others.
- Understand and apply the principles of nutrition and learn how to cook.

### **Skills and Techniques**

The skills and techniques set out in the progression document should be explored further during the school year should the need arise.

This may include:

- themed weeks
- additional design and technology lessons
- visitors and trips

## Key Stage 2 National Curriculum Subject Content

### Design

Pupils should be taught to:

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at individuals or groups.
- Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

### Make

Pupils should be taught to:

- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.
- Select from and use a wider range of materials and components, including construction materials, textiles, and ingredients, according to their functional properties and aesthetic qualities.

### Evaluate

Pupils should be taught to:

- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- Understand how key events and individuals in design and technology have helped shape the world.

### Technical Knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers, and motors].
- Apply their understanding of computing to program, monitor and control their products.

### Cooking and Nutrition

Pupils should be taught to:

- Understand and apply the principles of a healthy and varied diet.
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
- Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

### Key Questions:

- ✓ What is the aim of your project?
- ✓ What steps did you take before making the product?
- ✓ Can you talk me through the making process?
- ✓ What worked well?
- ✓ What did you find challenging?
- ✓ How did you deal with any challenges?
- ✓ What might you change next time and why?

## LKS2

## UPKS2

**Across KS2 pupils should:**

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing.

They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry, and the wider environment].

Children use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at individuals or groups.

They generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design.

- Identify the design features of their products that will appeal to intended customers.
- Explore a range of existing products to help generate their ideas.
- Design innovative and appealing products that have a clear purpose and are aimed at a specific user.
- Explain how particular parts of their products work.
- Use annotated sketches and cross-sectional drawings to develop and communicate their ideas.
- When designing, explore different initial ideas before coming up with a final design.
- When planning, start to explain their choice of materials and components including function and aesthetics.
- Test ideas out through using pattern pieces and prototypes.
- Develop and follow simple design criteria.
- Work in a broader range of relevant contexts, for example entertainment, the home, school, leisure, food industry and the wider environment.

- Use research to inform and develop detailed design criteria to inform the design of innovative, functional, and appealing products that are fit for purpose and aimed at a target market.
- Use their knowledge of a broad range of existing products to help generate their ideas.
- Design products that have a clear purpose and indicate the design features of their products that will appeal to the intended user.
- Explain how particular parts of their products work.
- Use annotated sketches, cross-sectional drawings, and exploded diagrams (possibly including computer-aided design) to develop and communicate their ideas.
- Generate a range of design ideas and clearly communicate final designs.
- Use computer-aided design to develop and communicate their ideas.
- Consider the availability of resources when planning out designs.
- Work in a broad range of relevant contexts, for example conservation, the home, school, leisure, culture, enterprise, industry, and the wider environment.

**Across KS2 pupils should:**

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of making.

Children select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] accurately.

They select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

**Plan**

- Carefully select from a range of tools and equipment,
- Select from a range of materials and components according to their functional properties and aesthetic qualities.
- Place the main stages of making in a systematic order.

**Practical skills and techniques**

- Learn to use a range of tools and equipment safely, appropriately, and accurately and learn to follow hygiene procedures.
- Use a wider range of materials and components, including construction materials and kits, textiles, and mechanical and electrical components.
- With growing independence, measure and mark out to the nearest cm and millimetre.
- Cut, shape and score materials with some degree of accuracy.
- Assemble, join, and combine material and components with some degree of accuracy.
- Demonstrate how to measure, cut, shape and join fabric with some accuracy to make a simple product.
- Join textiles with an appropriate sewing technique.
- With guidance, select and use different and appropriate finishing techniques to improve the appearance of a product.

**Plan**

- Independently plan by suggesting what to do next.
- With growing confidence, select from a wide range of tools and equipment, explaining their choices.
- Select from a range of materials and components according to their functional properties and aesthetic qualities.
- Create step-by-step plans as a guide to making.

**Practical skills and techniques**

- Learn to use a range of tools and equipment safely and appropriately and learn to follow hygiene procedures.
- Use a wide range of materials and components, including construction materials and kits, textiles, and mechanical and electrical components.
- Independently take exact measurements and mark out, to within 1 millimetre.
- Cut a range of materials with precision and accuracy.
- Shape and score materials with precision and accuracy.
- Assemble, join, and combine materials and components with accuracy.
- Demonstrate how to measure, make a seam allowance, tape, pin, cut, shape and join fabric with precision to make a more complex product.
- Join textiles using a greater variety of stitches, such as backstitch, whip stitch, blanket stitch.
- Refine the finish using techniques to improve the appearance of their product, such as sanding, or a more precise scissor cut after roughly cutting out a shape.

## Evaluate

### Across KS2 pupils should:

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

Children investigate and analyse a range of existing products.

They evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

They understand how key events and individuals in design and technology have helped shape the world.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                     |
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| <ul style="list-style-type: none"><li>• Explore and evaluate existing products, explaining the purpose of the product and whether it is designed well to meet the intended purpose.</li><li>• Explore what materials/ingredients products are made from and suggest reasons for this.</li><li>• Consider their design criteria as they make progress and are willing to alter their plans, sometimes considering the views of others if this helps them to improve their product.</li><li>• Evaluate their product against their original design criteria.</li><li>• Evaluate the key events, including technological developments, and designs of individuals in design and technology that have helped shape the world.</li></ul> | <ul style="list-style-type: none"><li>• Complete detailed competitor analysis of other products on the market.</li><li>• Critically evaluate the quality of design, manufacture, and fitness for purpose of products as they design and make.</li><li>• Evaluate their ideas and products against the original design criteria, making changes as needed.</li></ul> |
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**Across KS2 pupils should:**

Children apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

They understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].

They understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].

They apply their understanding of computing to program, monitor and control their products.

- Understand that materials have both functional properties and aesthetic qualities.
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures to create more useful characteristics of products.
- Understand and demonstrate how mechanical and electrical systems have an input and output process.
- Make and represent simple electrical circuits, such as a series and parallel, and components to create functional products.
- Explain how mechanical systems such as levers and linkages create movement.
- Use mechanical systems in their products.

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures to create more useful characteristics of products.
- Understand and demonstrate that mechanical and electrical systems have an input, process, and output.
- Explain how mechanical systems, such as cams, create movement and use mechanical systems in their products.
- Apply their understanding of computing to program, monitor and control a product.

**Across KS2 pupils should:**

Understand and apply the principles of a healthy and varied diet.

Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.

Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

- Start to know when, where and how food is grown (such as herbs, tomatoes, and strawberries) in the UK, Europe and the wider world.
- Understand how to prepare and cook a variety of predominantly savoury dishes safely and hygienically.
- With support, use a heat source to cook ingredients showing awareness of the need to control the temperature of the hob and/or oven.
- Use a range of techniques such as mashing, whisking, crushing, grating, cutting, kneading, and baking.
- Explain that a healthy diet is made up of a variety and balance of different food and drink, as represented in the Eatwell Guide, and be able to apply these principles when planning and cooking dishes.
- Understand that to be active and healthy, nutritious food and drink are needed to provide energy for the body.
- Prepare ingredients using appropriate cooking utensils.
- Measure and weigh ingredients to the nearest gram and millilitre.
- Start to independently follow a recipe.
- Start to understand seasonality.

- Know, explain, and give examples of food that is grown (such as pears, wheat and potatoes), reared (such as poultry and cattle) and caught (such as fish) in the UK, Europe and the wider world.
- Understand seasonality, how this may affect the food availability and plan recipes according to seasonality.
- Understand that food is processed into ingredients that can be eaten or used in cooking.
- Demonstrate how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source.
- Demonstrate how to use a range of cooking techniques, such as griddling, grilling, frying, and boiling.
- Explain that foods contain different substances, such as protein, that are needed for health and be able to apply these principles when planning and preparing dishes.
- Adapt and refine recipes by adding or substituting one or more ingredients to change the appearance, taste, texture and aroma.
- Alter methods, cooking times and/or temperatures.
- Measure accurately and calculate ratios of ingredients to scale up or down from a recipe.
- Independently follow a recipe.

| Vocabulary Development                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| Mechanical Systems                                                                                                                                                                                                                                                                                                                                                     | Electrical Systems                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><u>LKS2- Levers and linkages</u></p> <p>Levers, linkages, forces, join, pivot, input, output</p> <p><u>UKS2 – Pulleys, gears, and cams</u></p> <p>pulley, drive belt, gear rotation, spindle, driver, follower, axle, motor</p> <p>Mechanical system, electrical system, input, process, output</p>                                                                 | <p><u>LKS2 – Simple circuits &amp; switches</u></p> <p>Series, circuit, fault, connection, toggle switch, push-to-make switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip.</p> <p>Control, program, system, input device, output device</p> <p><u>UKS2 – More complex switches &amp; circuits (including LKS2)</u></p> <p>Parallel circuit, names of switches and components, monitor, flowchart</p>  |
| Textiles                                                                                                                                                                                                                                                                                                                                                               | Structures                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><u>LKS2 – 2D shape to 3D product</u></p> <p>Fabric, fastening, stuffing, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam.</p> <p><u>UKS2 – combining different fabric shapes (including LKS2)</u></p> <p>Wadding, reinforce, right side, wrong side, hem, pins, needles, iron transfer, pattern pieces, combine</p> | <p><u>LKS2 – Shell structures</u></p> <p>Shell structure, 3D, shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, tabs, adhesive, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing,</p> <p><u>UKS2 – Frame structures (including LKS2)</u></p> <p>Solid structure, frame, Triangulation, stability, temporary, permanent, research</p> |

## Vocabulary Development

### Cooking and Nutrition

#### LKS2 – Healthy and Varied Diet

Equipment, utensils, ingredients

Bake, balance, crush, energy, gram, heat source, knead, mash, oven, millilitre, preparation,

Texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury,

Hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested, healthy, active, varied diet.

#### UKS2 – Celebrating Culture & Seasonality (including LKS2)

Yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs,

Fat, sugar, carbohydrate, protein, vitamin, nutrients, nutrition, allergy, intolerance, source,

Boiling, griddling, grilling, ratios, scale, substitute.

| Suggested Curriculum Overview |                                                                                      |                                                                                                                   |                                                              |
|-------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|                               | Autumn                                                                               | Spring                                                                                                            | Summer                                                       |
| Y3                            | <b>Textiles</b><br>Christmas bauble<br>(Incorporating textile art and design skills) | <b>Food Technology</b><br>TBC                                                                                     | <b>Structures</b><br>Building a pyramid<br>(History/English) |
| Y4                            | <b>Mechanical Systems</b><br>Roman catapults<br>(History/English)                    | <b>Electrical Systems</b><br>Design and make a buzzer game<br>(Science)                                           | <b>Food Technology</b><br>TBC                                |
| Y5                            | <b>Mechanical Systems</b><br>Ancient Greek technology<br>(History/English)           | <b>Textiles</b><br>Frida Kahlo inspired headbands<br>(Incorporating textile art and design skills)<br>(Geography) | <b>Food Technology</b><br>TBC                                |
| Y6                            | <b>Electrical Systems</b><br>Santa Mobile<br>(Science)                               | <b>Structures</b><br>Bug City                                                                                     | <b>Food Technology</b><br>TBC                                |